



**THERAPY ASSISTANCE BY GENERAL
RADIOGRAPHERS**

Training Program Curriculum and Objectives

March 21, 2002

THERAPY ASSISTANCE BY GENERAL RADIOGRAPHERS

Training Program Curriculum and Objectives

The curriculum content is designed for standard progressive educational techniques that provide integration of knowledge with clinical practice. Students shall complete 560 hours of training (1 hour training = 60 minutes) and pass a comprehensive final examination developed and administered by the training program. Training content areas are included in more than one curriculum subject area to address the issues of knowledge, diversity of concepts, and application of that knowledge (integration) for the actual performance of all tasks identified.

Training Content	Curriculum Subjects
Principles of radiation therapy treatment	Orientation to Radiation Therapy, Radiation Therapy Patient Care, Principles & Practice of Radiation Therapy, Clinical Assistance
Biological effects of radiation	Radiation Protection, Radiation Biology
Radiation exposure and monitoring	Orientation to Radiation Therapy, Radiation Protection
Radiation safety and protection	Orientation to Radiation Therapy, Radiation Protection
Evaluation and handling of radiographic treatment equipment and accessories	Radiation Therapy Physics & Simulation, Principles & Practice of Radiation Therapy, Clinical Assistance
Patient positioning for radiation therapy treatment	Radiation Therapy Physics & Simulation, Principles & Practice of Radiation Therapy, Clinical Assistance

TASKS STATEMENT

This curriculum prepares general radiographers who assist radiation therapy technologists to:

- 1) Perform and document warm-up procedures, excluding quality assurance checks, as recommended by manufacturer.
- 2) Inspect treatment area and accessory devices and report any unsafe conditions.
- 3) Inform patient what will be required of him/her during the procedure.
- 4) Provide assistance as necessary to bring patient into the simulation or treatment room and help him/her onto the simulation or treatment table.
- 5) Determine appropriate immobilization devices and positioning aids for simulation.
- 6) Manufacture individualized immobilization devices.
- 7) Prepare and position patient on simulator table using positioning aids and immobilization devices.
- 8) Perform all duties in ways that minimize unnecessary radiation exposure to personnel and patients.
- 9) Prepare the simulation equipment and accessories.
- 10) Determine appropriate exposure factors to obtain optimum image quality on simulation machine.
- 11) Use simulation machine to radiograph the preliminary field marked by collimator wires or other localizing devices.
- 12) Identify and label the simulation image.
- 13) Present simulation films to radiation oncologist for approval or field modification.
- 14) Initiate field changes on simulation machine as indicated by the radiation oncologist on the simulation image.
- 15) Record simulation and treatment machine parameters used in simulation on treatment chart/worksheet and simulation images.
- 16) Record and diagram patient positioning instructions used in simulation on treatment chart/worksheet.
- 17) Measure and record simulation information necessary to fabricate beam modifying devices.
- 18) Fabricate custom shielding blocks.
- 19) Prepare beam modifying devices (e.g., compensators, wedges).
- 20) Prepare bolus material.
- 21) Contour body parts during simulation.
- 22) Verify accuracy of custom shielding blocks on simulator prior to treatment
- 23) Instruct patient on maintenance of the treatment field markings.
- 24) Instruct patient concerning proper skin care of treatment area(s).
- 25) Examine treatment chart prior to daily treatment delivery by the radiation therapy technologist.
- 26) Verify that only the patient is in the treatment room prior to the radiation therapy technologist initiating treatment.
- 27) Sign chart after assisting with each treatment.
- 28) Recognize errors or problems in the evaluation and handling of treatment equipment, settings, and accessories.
- 29) Recognize errors or problems with patient positioning for radiation therapy treatment.

ORIENTATION TO RADIATION THERAPY

Content Description

Content will provide the participant with an overview of the foundations in radiation therapy and their role in the health care delivery system. The content will include a discussion of practice standards, law, ethical standards, and competence.

Objectives:

At the completion of the content outline, the participant must:

- 1) List the responsibilities of the radiation therapy technologist and assistant.
- 2) Describe the practice standards and scope of practice for the radiation therapy technologist.
- 3) Identify other health care professionals that participate in the patient's cancer and total health care.
- 4) Identify and discuss the responsibilities and relationships of all personnel in the radiation therapy department.
- 5) Define accreditation, credential, certification, registration, licensure and regulations.
- 6) Define ethics, professionalism, practice standards and code of ethics in radiation therapy.
- 7) Define and describe cancer management terminology.
- 8) Describe in general terms the radiation therapy treatment techniques.
- 9) Define and discuss key terms in radiation therapy.
- 10) Identify the contents/sections of the patient's radiation therapy chart.
- 11) Identify the components of the patient's chart required prior to procedures.
- 12) Recognize and adhere to the responsibility of patient, staff and facility confidentiality.
- 13) Describe the medical-legal issues involved in maintenance of radiation therapy records.
- 14) Identify the basic radiation safety procedures for personnel and patients in radiation therapy.
- 15) State the procedure for monitoring occupationally-exposed individuals in radiation therapy.
- 16) Identify basic health safety procedures for personnel and patients in radiation therapy.
- 17) Describe the ethical considerations in cancer management.
- 18) Compare and contrast moral and legal ethics; competence and incompetence.
- 19) Describe the criminal and civil legal issues relevant to personnel in radiation therapy.
- 20) Define and describe advanced directives.

RADIATION PROTECTION

Content Description

Content will present principles of radiation protection and safety specific to radiation therapy. Content will address specific responsibilities of the radiation therapy technologist and general radiographer therapy assistant.

Objectives:

At the completion of the content outline, the participant must:

- 1) Identify legal and ethical radiation protection responsibilities of radiation therapy technologists and general radiographer therapy assistants.
- 2) Identify and define units of radiation exposure, absorbed dose, dose equivalent and radioactivity.
- 3) Describe the theory and operation of radiation detection devices such as ion chambers, thermoluminescent dosimeters, sodium iodide detectors and GM meters.
- 4) List appropriate applications and limitations for each radiation detection device listed above.
- 5) Identify performance standards for beam directing, beam defining and beam limiting devices evaluated in a radiation protection equipment survey of a teletherapy machine and linear accelerators.
- 6) Describe procedures to verify performance standards for equipment and indicate potential consequences of performance standards failure.
- 7) Describe various interlocking systems for equipment and indicate potential consequences of interlock system failure.
- 8) Distinguish between controlled and noncontrolled areas and list acceptable exposure levels.
- 9) Describe purpose of "Radiation Area" signs and identify appropriate placement sites.
- 10) Describe the function of various state and local regulations governing radiation protection practices.
- 11) Distinguish between primary and secondary barriers.
- 12) Describe how the operation of various ancillary equipment influences radiation safety and describe the potential consequences of equipment failure.
- 13) Identify who should evaluate the ancillary and x-ray equipment and indicate the frequency with which these evaluations should be made; indicate how this is related to a quality assurance program for radiation safety.
- 14) Discuss the relationship between half-value (HVL) and shielding design.
- 15) Identify emergency procedures during failures of external beam control mechanisms.
- 16) Identify personnel/agencies to be notified in case of a misadministration.

RADIATION THERAPY PHYSICS & SIMULATION

Content Description

Content will provide a knowledge base for assisting with the various types of radiation therapy simulation equipment, procedures, and construction of immobilization devices and shielding blocks. The content will address roles and responsibilities of the general radiographer therapy assistant, the treatment prescription, the documentation of the simulation and localization parameters, and patient education needs.

Objectives:

At the conclusion of this content, the participant must:

- 1) State the roles and responsibilities of the general radiographer therapy assistant in radiation therapy simulation.
- 2) Explain the primary purpose of the radiation therapy simulation.
- 3) Contrast tumor localization and treatment verification.
- 4) Identify and describe the mechanical components of the conventional and CT simulator.
- 5) Describe the emergency procedures for simulator equipment failure.
- 6) Identify the type of radiation emitted and how it is produced.
- 7) Identify and correctly demonstrate the use of positioning and immobilization devices.
- 8) Identify the criteria utilized for selecting effective immobilization devices.
- 9) Demonstrate and contrast the procedures to construct specified immobilization devices.
- 10) Compare and contrast the construction of immobilization devices.
- 11) Identify the most commonly used and main advantage to a custom field shaping system.
- 12) Identify the parameters that must be obtained and recorded for a custom block.
- 13) Demonstrate the procedure for the construction of a custom block.
- 14) Describe the procedure for verifying the accuracy of custom shielding blocks.
- 15) Describe each of the factors considered before initiation of simulation for each patient.
- 16) Describe as you would to a patient the function and general process of a typical simulation procedure.
- 17) Define the common nomenclature and acronyms used during the simulation process.
- 18) Identify the differences between the SSD and SAD simulation approaches.
- 19) Identify the various contrast agents used during the simulation process.
- 20) Describe the components of a typical simulation procedure in a logical sequence, including fluoroscopy.
- 21) Compare the processes of treatment verification and simulation.
- 22) Determine proper radiographic factors to produce a quality radiograph of the treatment field.
- 23) Use appropriate topographic anatomy to properly position the desired treatment field.
- 24) Describe the parameters of treatment field design and arrangement used to treat neoplastic diseases associated with each anatomic site.
- 25) Describe the appropriate documentation of simulation/patient set-up information.
- 26) Prepare contours and associated data.
- 27) Explain the purpose of skin markings and/or tattoos and proper maintenance.

RADIATION BIOLOGY

Content Description

Content will present basic concepts and principles of radiation biology in radiation therapy. The content will address the theories and principles of tolerance dose, time-dose relationships, fractionation schemes and the relationship to the clinical practice of radiation therapy.

Objectives:

At the completion of the content outline, the participant must:

- 1) Describe principles of cellular biology and apply to principles of radiation biology.
- 2) Apply laws and principles of radiation biology to the clinical practice of radiation therapy.
- 3) Distinguish between units of radiation quantities and radiobiologic measures and demonstrate correct usage.
- 4) Identify factors influencing radiobiologic/biophysical events at the cellular and sub-cellular level.
- 5) Describe radiation induced chemical reactions and analyze biologic damage.
- 6) Describe factors influencing radiation response of cells and tissues.
- 7) Apply the principles of radiobiology to tumor cell biology and evaluate radiation effects anticipated in the clinical practice of radiation therapy.
- 8) Describe the relationship of time, dose, fractionation, volume and site to radiation effects.
- 9) Describe the use of radiation response modifiers in the clinical practice of radiation therapy.
- 10) Describe the principles of chemotherapy and the influence on biologic effects in combination with radiation therapy.

PRINCIPLES AND PRACTICE OF RADIATION THERAPY

Content Description

Content will provide a knowledge base to assist with the various types of radiation therapy equipment, treatment technique and procedures, patient positioning and immobilization for appropriate tumor localization and treatment delivery. The content will address the roles and responsibilities of the radiation therapy technologist and general radiographer therapy assistant, the treatment prescription, the documentation of treatment parameters and delivery, emergency procedures and patient condition and education needs.

Objectives:

At the conclusion of this content, the participant must:

- 1) Compare the role, duties, and functions of the radiation therapy technologist and general radiographer therapy assistant in treatment delivery.
- 2) Describe each of the factors taken into consideration prior to initiation of radiation therapy treatment for each patient.
- 3) Explain the relationship between various anatomic tumor sites and treatment modality selection.
- 4) Describe the method of photon and/or electron production for the various types of external beam radiation therapy equipment.
- 5) Compare and contrast the emergency procedures recommended by the manufacturer of each type of external beam therapy equipment.
- 6) Identify the advantages in terms of effectiveness of the various types of patient positioning devices.
- 7) Compare and contrast the types of beam directional equipment and their purposes and applications.
- 8) Compare and contrast the types of beam modifiers and their purposes and applications.
- 9) Compare and contrast the types of patient positioning and immobilization devices and their purposes and applications.
- 10) Describe the principles and practice of simulation and treatment as they apply to neoplastic diseases associated each with anatomic site.
- 11) Identify the parameters of treatment field design and arrangement used to treat neoplastic diseases associated with each anatomic site.
- 12) Identify patient acute and chronic side effects and/or complications encountered during a course of therapy and describe a management strategy that fosters healing and comfort for each anatomic site.
- 13) Identify patient physical conditions that would warrant physician attention prior to treatment.
- 14) Compare the treatment prescription and simulation/patient set-up information for appropriate completion and accuracy.
- 15) Identify potential machine malfunctions that mandate immediate action.

RADIATION THERAPY PATIENT CARE

Content Description

Content will provide the participant with foundation concepts and competencies in assessment and evaluation of the patient for service delivery. Content will address psychological and physical needs and factors affecting treatment outcome.

Objectives:

At the completion of the content outline, the participant must:

- 1) Differentiate between the roles and responsibilities for health care team members treating cancer patients.
- 2) Differentiate between the Scope of Practice for the radiation therapy technologists and the general radiographer therapy assistant.
- 3) Discuss Code of Ethics for radiation therapy technologists and general radiographer therapy assistants.
- 4) Summarize the Bill of Rights for Patients.
- 5) Assess the challenges of communicating with the cancer patient and family.
- 6) Identify the factors that influence a patient's emotional responses.
- 7) Formulate answers to questions frequently asked by patients.
- 8) Assess the physical condition of the patient before, during and after treatment delivery.
- 9) Identify appropriate procedures/examinations for patients.
- 10) Demonstrate proper care of patient medical devices such as catheters, ostomy tubes, and nasogastric tubes during therapy.
- 11) Recognize radiation side effects/complications and select the appropriate medical intervention.
- 12) Recognize the limitations of physical activity in cancer patients.
- 13) Select and present appropriate patient education materials.

CLINICAL ASSISTANCE

Content Description

Content and clinical practice experiences will provide sequential development, application, and integration of concepts and theories in radiation therapy. Concepts of team practice and patient-centered clinical practice shall be discussed and demonstrated through structured sequential assignments in clinical facilities. Clinical practice experiences will provide care to the patient in the therapeutic setting for simulation and assistance with the delivery of a prescribed course of treatment.

Objectives:

At the conclusion of the clinical practice, the participant will be able to:

- 1) Identify priorities in daily clinical practice.
- 2) Establish concepts of team practice that focus on establishing priorities, roles of team members, variation in membership, role negotiation, and conflict resolution.
- 3) Establish patient-centered clinically effective assistance with service delivery strategies.
- 4) Assist the radiation therapy technologist to implement a prescribed course of treatment following acceptable departmental, institutional, governmental and professional standards.
- 5) Discuss the patient's status and condition with the radiation therapy technologist to assist with treatment delivery.
- 6) Demonstrate the technologies and methodologies for treatment delivery.
- 7) Demonstrate the principles of radiation protection standards.
- 8) Explain the clinical significance of the treatment parameters as prescribed.
- 9) Construct/prepare immobilization, beam directional and beam modification devices.
- 10) Perform simulation and localization procedures, including fluoroscopy.
- 11) Establish appropriate and effective written, oral and nonverbal communication with communities of interest.
- 12) Demonstrate safe, ethical and legal practices.
- 13) Recognize and respect the clinical significance of the patient's personal beliefs and values for compliance with the overall treatment plan.
- 14) Describe the psychological and physical changes in the patient's condition and formulate appropriate patient education.
- 15) Appraise cultural and age differences that influence patient compliance with treatment.
- 16) Apply appropriate principles for transferring, positioning and immobilizing the patient.
- 17) Apply concepts of teaching and learning theories in design, implementation and evaluation in the education of patient, and family.
- 18) Document all aspects of patient care and management in the appropriate record.
- 19) Assess, evaluate and demonstrate life support procedures.
- 20) Document knowledge of the institution's procedures in response to emergencies, disasters and accidents.
- 21) Identify and respond to rapid physiological changes in the patient's condition.
- 22) Evaluate, assess and apply all treatment delivery equipment and accessories.